

U.S. CLIMATE REFERENCE NETWORK (USCRN)



**Presented by
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U.S. Climate Reference Network

WHY A Climate Reference Network?

Accuracy and Fidelity of Climate Data are Crucial to Long Term Climate Monitoring & U.S. Economy

- U.S. National Research Council (NRC), “Adequacy of Climate Observing Systems” (1999)
- U.N. World Climate Research Programme (August 1997)
 - Comprehensive Observations of the Climate System are Critical
 - Current Observational Networks are Inadequate and Deteriorating

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“A Climate Services Vision”

NRC (Dec 2001)

“The value of climate observations tend to increase with accuracy, consistency, and continuity over time.”

New climate observing systems should follow the 10 Climate Monitoring principles NRC (1999)

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A New Climate-Observing Network

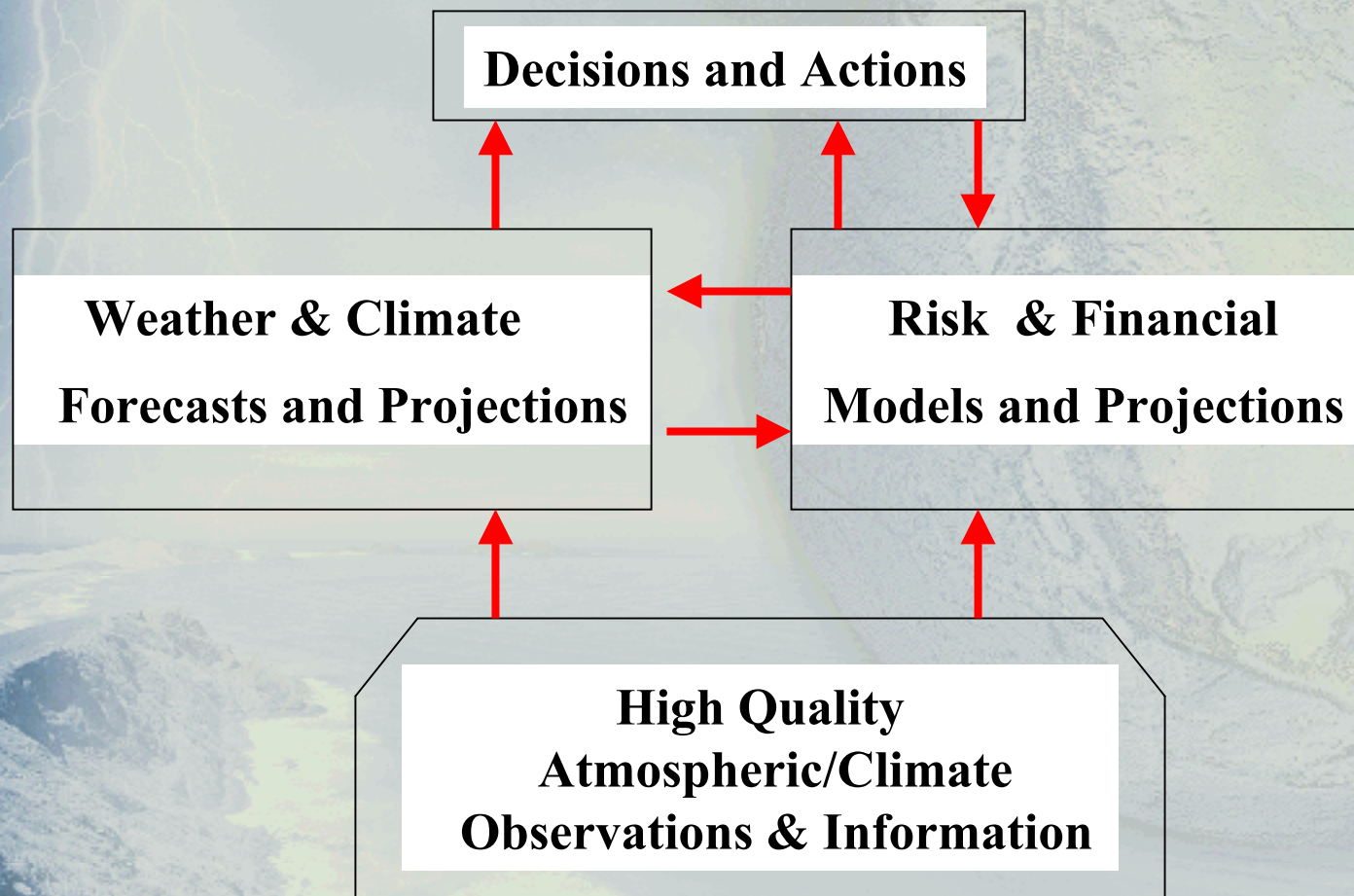
CRN Vision:

Fifty years from now the USCRN will be able to answer with the highest degree of confidence the question: How has the climate of the U.S. changed over the past 50 years?

CRN Goal:

Provide the highest possible quality long-term observations of surface air temperature and precipitation to improve the interpretation of decadal to centennial climate variability and change.

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Guidelines:

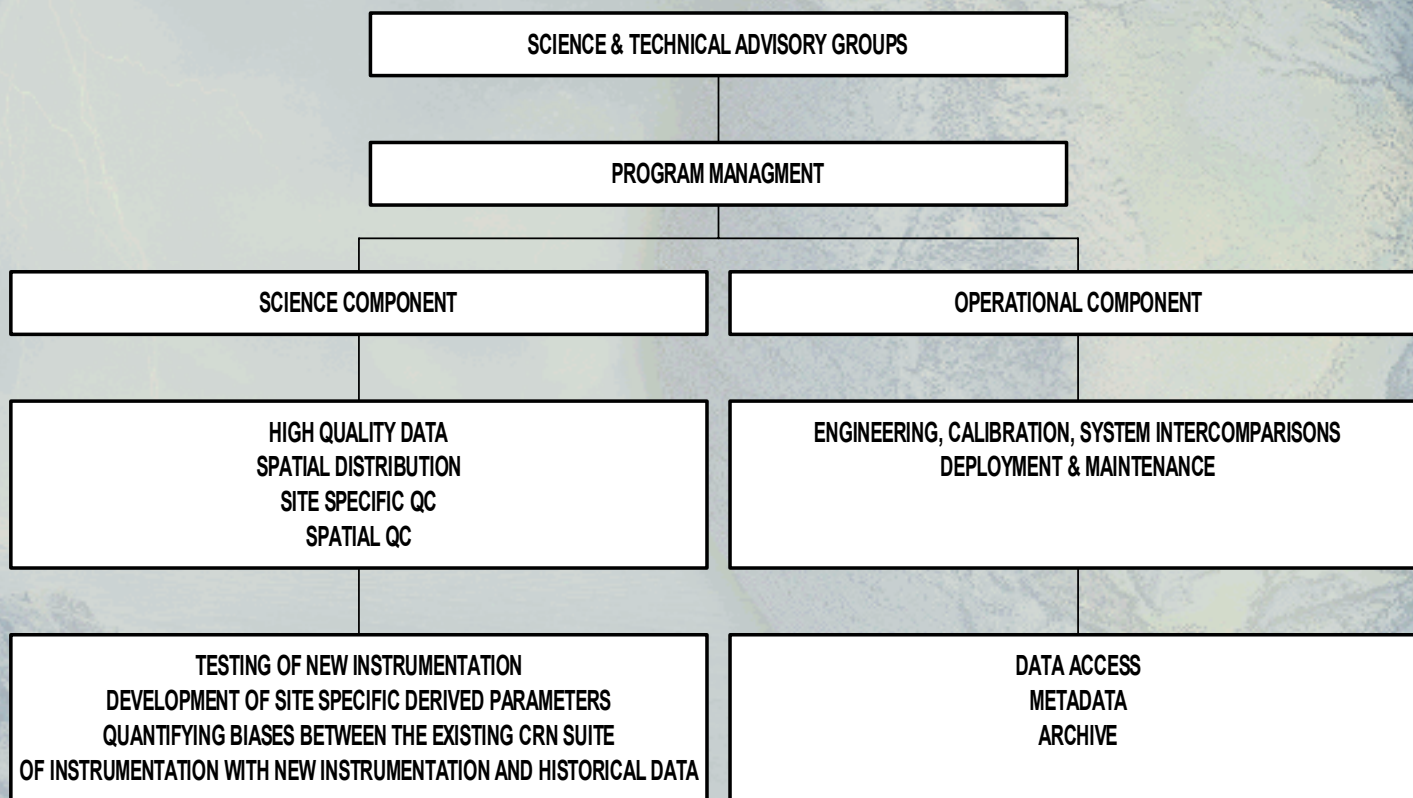
- Adherence with the 10 Climate Monitoring Principles recognized by the NRC & WMO.**
- Network meets the requirements of the Global Climate Observing System (GCOS).**
- Implemented and managed by NOAA/NESDIS/NCDC in Asheville, NC.**
- Scientists and Engineers Support from the NOAA/ARL/ATDD, Oak Ridge, TN**

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Unique Requirements:

- National Benchmark Reference Stations to measure long-term climate changes and reference standard for other networks (ASOS, COOP, etc.)
- Long-term Stable Locations
- Detailed Documentation accessible via the web
- Redundant Simultaneous Measurements of Temperature and Precipitation
- Hourly Reporting and Hourly Posting to Web for Immediate Access
- Immediate “Rule Based” Quality Control of incoming data
- Daily Network Performance Monitoring

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SCIENCE COMPONENT

OBJECTIVES

REFERENCE COMPARISONS WITH OTHER OBSERVING SYSTEMS UTILIZED FOR FORECASTING AND CLIMATE CHANGE DETECTION

AN UNDERSTANDING OF THE MAGNITUDE OF THE BIASES INTRODUCED BY CHANGING INSTRUMENTATION OR UTILIZING DATA FROM DIFFERENT NOAA OBSERVING NETWORKS

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FY 02 STUDIES

- EVALUATION OF HUMIDITY SENSORS
- COLLABORATIVE MULTI-YEAR STUDY ON PRECIPITATION MEASUREMENTS LIQUID AND FROZEN
- EVALUATION OF ALTERNATIVE TEMPERATURE SENSORS
- COLLABORATIVE STUDIES ON SOIL MOISTURE AND TEMPERATURE SENSORS
- STUDY TO DETERMINE LENGTH OF USCRN SITE RECORDS NEEDED TO INITIALLY IDENTIFY TRENDS

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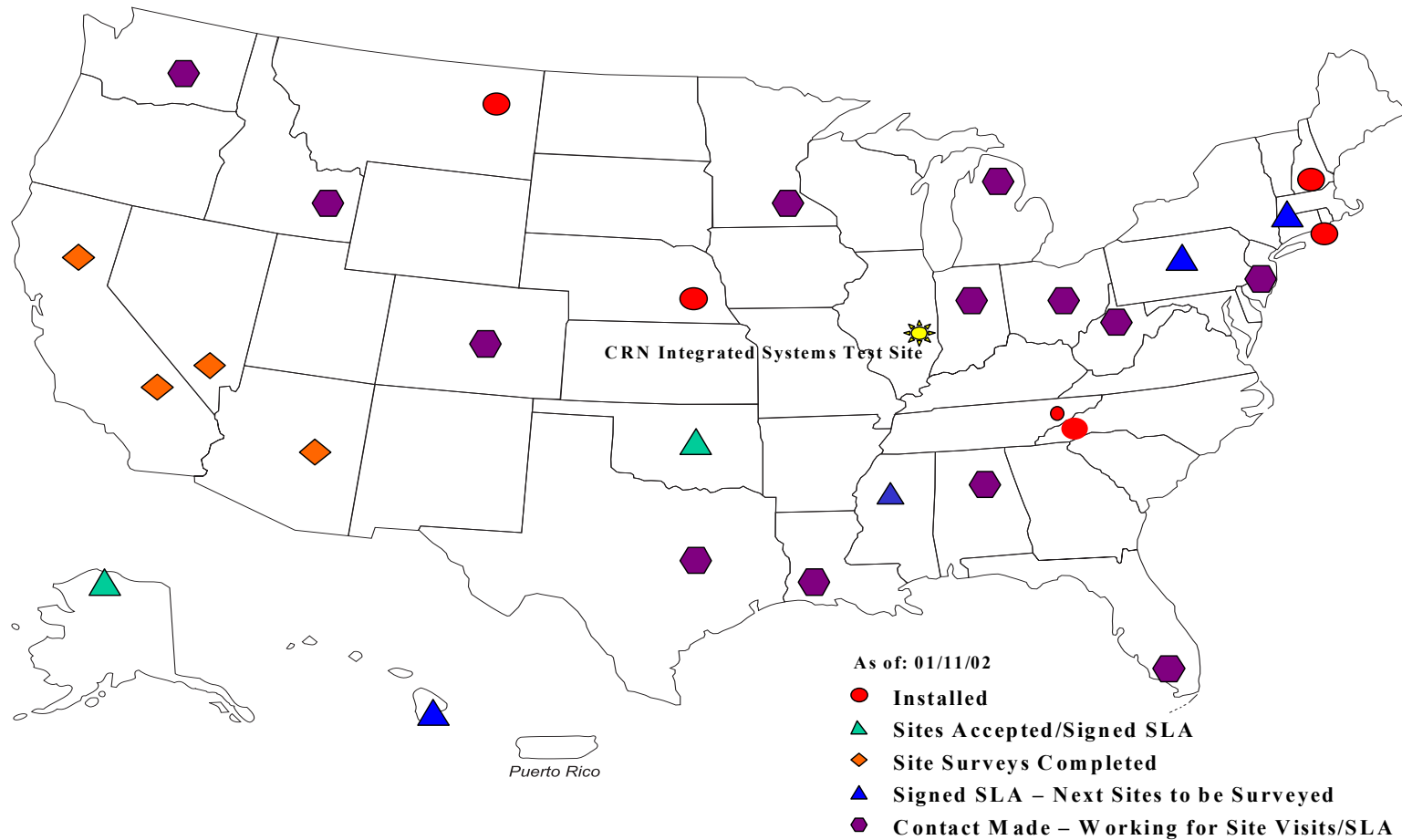
OPERATIONAL COMPONENT

- On-Line Ingest
 - GOES DCS operational
 - stable/rapid delivery
 - QC software operational
 - Web access complete
- Precipitation Gauge
 - Primary Precipitation Gauge - Geonor
 - Wind Shield Selected (Small DFIR w/Alter)
- Instrument Suites
 - Sensors being lab calibrated at ATDD/Oak Ridge
 - Suites undergoing field tests at Bondville, IL site
 - 10 sites installed (MT, NE, NH, NC, and RI)



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Proposed First 26 CRN Geographic Locations (Two CRN Instrument Sites per Geographic Location)



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Bondville, IL Inter-comparison Site
System Burn-in and Bias



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NOAA\OAR\CMDL Site Point Barrow, AK



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**Fort Peck Assinibone & Sioux Tribes Reservation
Poplar River Site, Wolf Pt. MT**



QUALITY CONTROL OF THE CRN DATA

PARAMETER

RANGE CHECK

STEP CHECK

PERSISTENCE

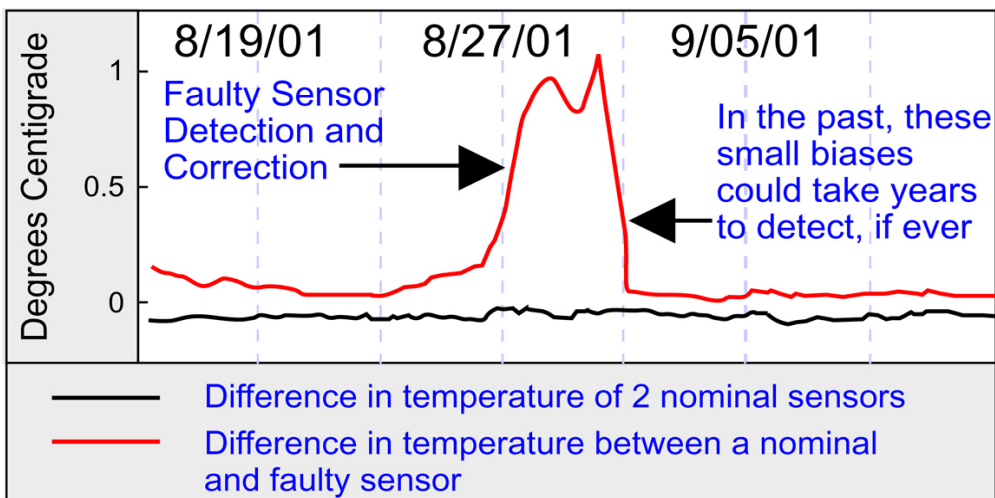
CLIMATOLOGY

QA FLAGS

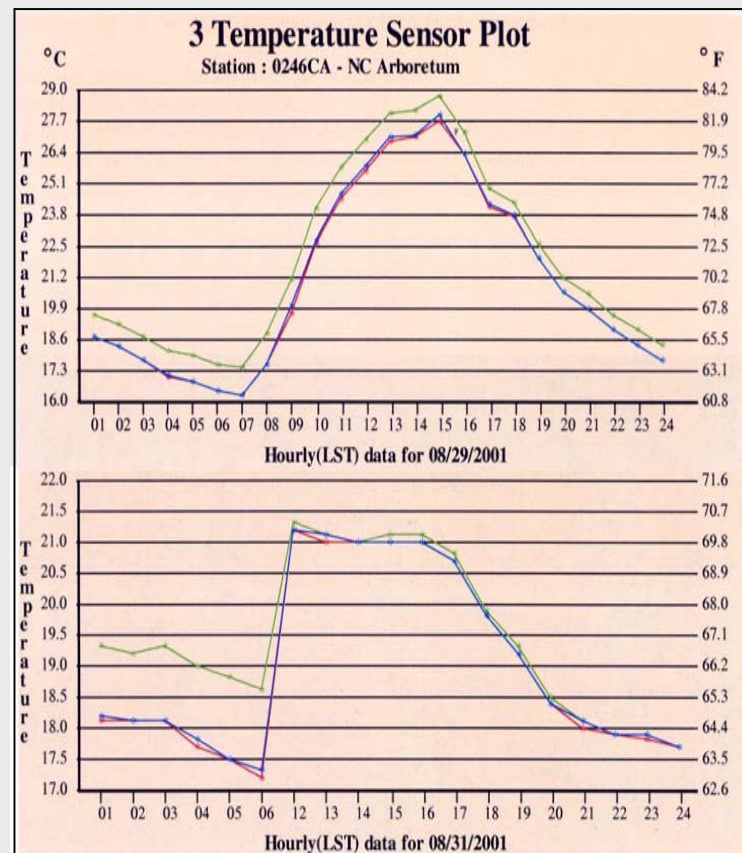
0 GOOD	DATUM HAS PASSED ALL TESTS
1 SUSPECT	ACCURACY CONCERN
2 WARNING	QUESTIONABLE
3 FAILURE	DATUM IS UNUSEABLE
4 NOT INSTALLED YET	AWAITING INSTALLATION
5 KNOWN GOOD	SET FLAG TO 0
9 MISSING DATA	DATUM MISSING

The Climate Observing System: *What is needed?*

U.S. Climate Reference Network Real-time Network Performance Monitoring



High Quality Temperature Measurements



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FY 03 and Beyond

- **Complete Deployment of full network (funding permitting)**
- **Incorporate additional sensors, i.e. Relative Humidity, Second Precipitation Gauge, Soils sensors, others.**
- **Improve Science and Modernize Sensors and Equipment**
- **Place USCRN data into historical, present, and projected future climate trends**
- **Utilize USCRN sites as “ground truth” benchmarks for surface and space based observing systems**

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